

M303 Guide

Introduction

This module gives you a broad overview of topics that are important in the modern development and theory of mathematics. It introduces you to number theory, the algebraic theory of rings and fields, and the theory of metric spaces. You will also further develop your understanding of group theory and real analysis, as introduced in [Pure mathematics \(M208\)](#).

In addition, you'll look at how these ideas are applied to cryptography and fractals.

To study this module you should have a sound knowledge of relevant mathematics, including group theory, linear algebra, convergence of real sequences and continuity of real functions, as provided by the appropriate level 2 study. The [Are you ready quiz?](#) will give you an idea of what you are expected to know.

Use of technology

Since you are reading this guide, you have clearly reached the M303 website using a computer with internet access. Most of the module materials are printed (as described in [The module components](#)), but note that you will need your computer and internet connection in order to access the following:

- The tutor-marked assignments (TMAs). You will also have the option to submit these online, if you wish. If you submit online, then you must submit your TMA as a **single pdf** (a word document or a set of multiple pdfs will not be accepted). Please read the instructions on the module website carefully before submitting your work.
- The interactive computer-marked assignment (iCMA), which forms part of the assessment, and the practice quizzes that lead up to it.
- Other supplementary materials, including the *History Reader* and the specimen exam paper.

- The module forums and News.

No programming or scientific software is required for this module, but it may be helpful to have a basic scientific calculator or access to a Computer Algebra System such as Maxima. However, note that you will not be allowed to take your calculator into the examination.

The module components

This module consists of the following:

- This **website**. It is important that you check this website frequently, as Errata and News items will be posted here. The website also gives you access to the forums, which you can use to communicate with other students and with the M303 team.
- The **study planner** is the backbone of the M303 website and provides you with a suggested schedule for your studies. On it you will see that we have labelled some M303 material as core and some as non-essential. These terms are explained in a section at the top and you should read this section before you start to work on M303.

The study planner is divided into weeks or groups of weeks, each of which indicates any material that is non-essential or that is core, links to the resources that you need in order to study that part of the module and indicates cut-off dates for assignments. You can use this to pace yourself through the module.

- A set of six printed **study texts**, whose individual chapters are also provided as PDFs linked from the study planner. You should refer to the information on non-essential material and core material given in the relevant part of the study planner when reading the texts.
- A printed **Handbook**, also available as a PDF from the [Resources](#) area of the M303 website. The *Handbook* is provided to give you a convenient source of notation and definitions throughout the year and for use during the examination. It is a good idea to start using it from the beginning of the module, so that you familiarise yourself with its contents. Only the printed copy of the *Handbook* sent to you in the mailing can be taken into the examination; copies downloaded from the module website will not be allowed. Please also

note that only a basic level of annotation is permitted. Further details can be found in the [Assessment](#) area of the M303 website.

- An online **History Reader**, available only on the M303 website. This provides an unassessed overview of the historical development of metric spaces and modern algebra. Where appropriate, the *Reader* includes information about modern applications and unsolved/recently solved problems.
- Six **TMA**s (tutor-marked assignments) – one associated with each book – available only on the M303 website.
- One **iCMA** (interactive computer-marked assignment), available only on the M303 website. It will not be available until towards the end of the module.
- Seven **practice quizzes**, one for each book, together with an exam-like practice quiz to help you with exam revision, linked from the study planner. These may not all be available at module start but will appear at the appropriate time.
- A **specimen examination paper and solutions**, available only on the M303 website.

Assessment

The assessment for this module comprises six tutor-marked assignments (TMAs), one interactive computer-marked assignment (iCMA) and an examination.

Please refer to the [Assessment Handbook](#) for the rules that establish how your performance will determine your final grade.

Continuous assessment

The continuous assessment for M303 consists of six tutor-marked assignments (TMAs) and one interactive computer-marked assignment (iCMA). Each TMA counts for 2.86% of your overall module score and the iCMA counts for 2.84%. Working through the TMAs and the iCMA is a vital part of the learning process, and completing them will also provide you with valuable feedback on your understanding, presentation, method, etc.

You will notice that each TMA has both formative and summative questions. Your scores on formative questions do not contribute directly to your score; however, these

formative questions are carefully designed so that doing them, and thinking about them, will help your understanding. There is more information on how to approach the formative questions on the study planner.

The online-only practice quizzes will help you to prepare for your iCMA. These are also formative and do not count towards your overall score.

The examination

Your examination score is based on a three-hour examination at the end of the module and counts for 80% of your overall score. You should familiarise yourself with the format of the examination well in advance.

A specimen examination paper is available on the M303 website, and you should work through this carefully before the examination date. Sample solutions are also provided.

Information about the materials you can take into the examination can be found in the [Assessment](#) area of the website.

Support for your studies

It is important to try to keep to the schedule as indicated by the study planner. Each assignment cut-off date is usually very soon after the end of the last study week for the relevant book. We recommend that you work through the assignment questions relating to each chapter of a book as soon as you finish that chapter. Otherwise, you will have a lot of work to do in the final few days before the cut-off date.

Accessibility information is available in the [Resources](#) area of the website.

Your tutor

Your tutor is there to help you understand the ideas in M303, and will provide comments and feedback on your written assignments. Your tutor will also be able to help you with the formative parts of the assignments and will be expecting you to make proactive contact if you are unable to complete these. You are advised to go through each marked assignment in detail, and to take note of the comments written by your tutor; they will help you to avoid similar errors in later TMAs and in the examination.

Try to attend tutorials. There you will have the opportunity to talk to a tutor directly and, just as importantly, talk to other students.

Your fellow students

One of the best ways of learning is by talking about your work with your fellow students. A convenient way to keep in touch is to use the M303 forums, which are accessible from the front page of this website.

Other support

You are not expected to study alone. Support is available from your tutor, through tutorials, and via the M303 website. If you experience difficulties that are not directly related to the content of M303, you are welcome to contact your Student Support Team (see your StudentHome page for details).